

Supporting Information

Screw-Dislocation-Driven Growth of Two-Dimensional Few-Layer and Pyramid-Like WSe₂ by Sulfur-Assisted Chemical Vapor Deposition

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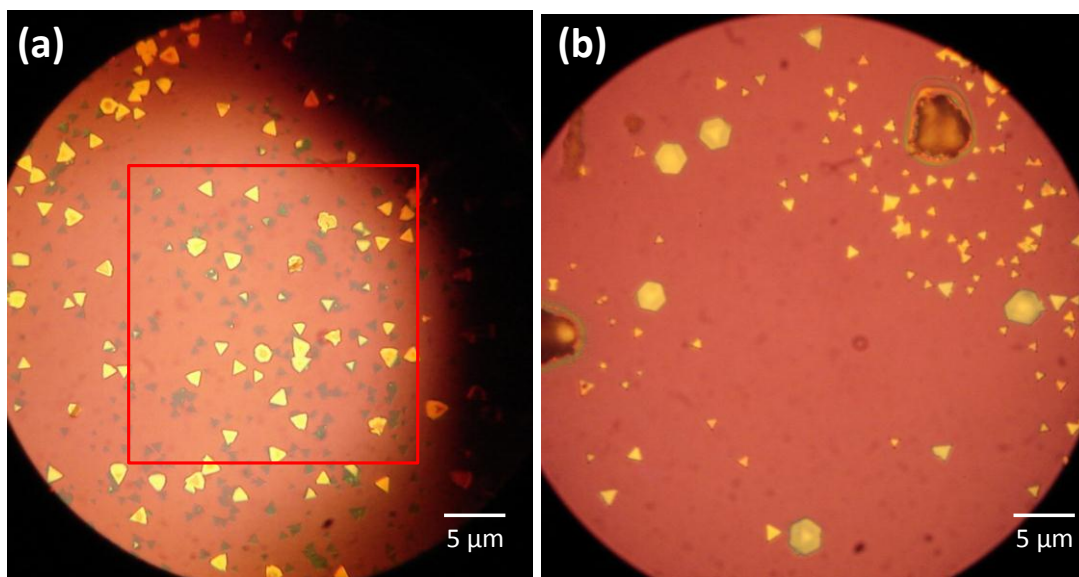


Figure S1. Optical images of samples grown at different temperatures. (a) Samples grown at 900 °C. Both thin triangular and thick triangular flakes are observed. (b) Samples grown at 925 °C. All the flakes are thick ones, and hexagonal flakes can be found at this growth temperature.

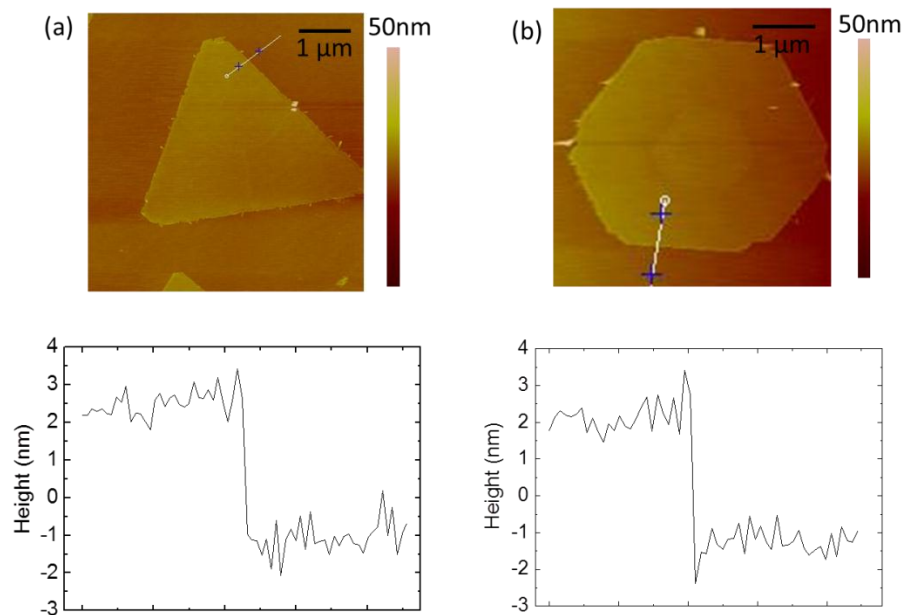


Figure S2. AFM images of thin WSe₂ flakes along with their cross-section height profiles. (a) A triangular WSe₂ flake with a height of ~3.5 nm, corresponding to four-layers. (b) Another hexagonal WSe₂ flake with a height of ~3.5 nm, corresponding to four-layers as well.

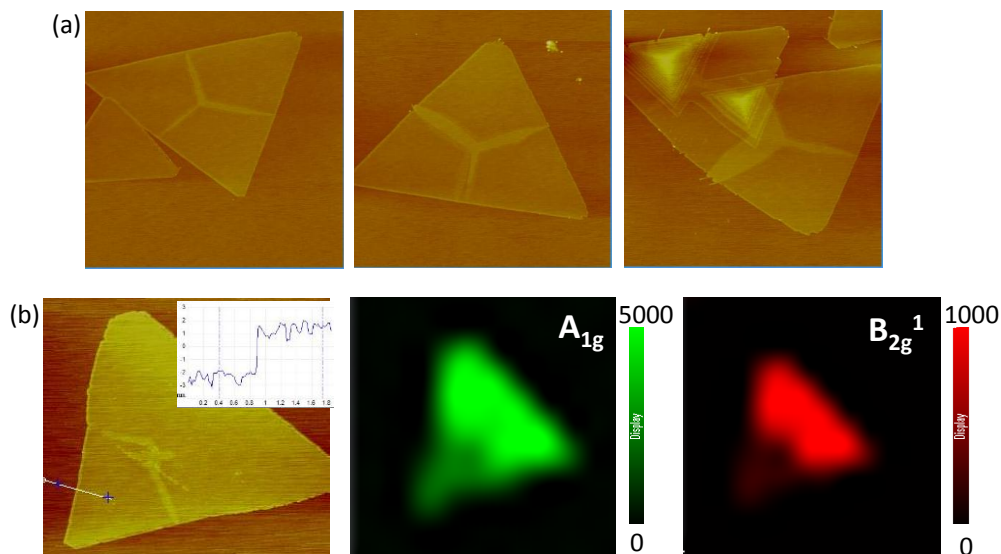


Figure S3. AFM and Raman studies on thin flakes with ribbon features. (a) AFM images of thin flakes with clear ribbon features on top. (b) AFM image along with Raman intensity mappings for A_{1g} and B_{2g}¹ modes of WSe₂ on a thin flake with ribbon features.

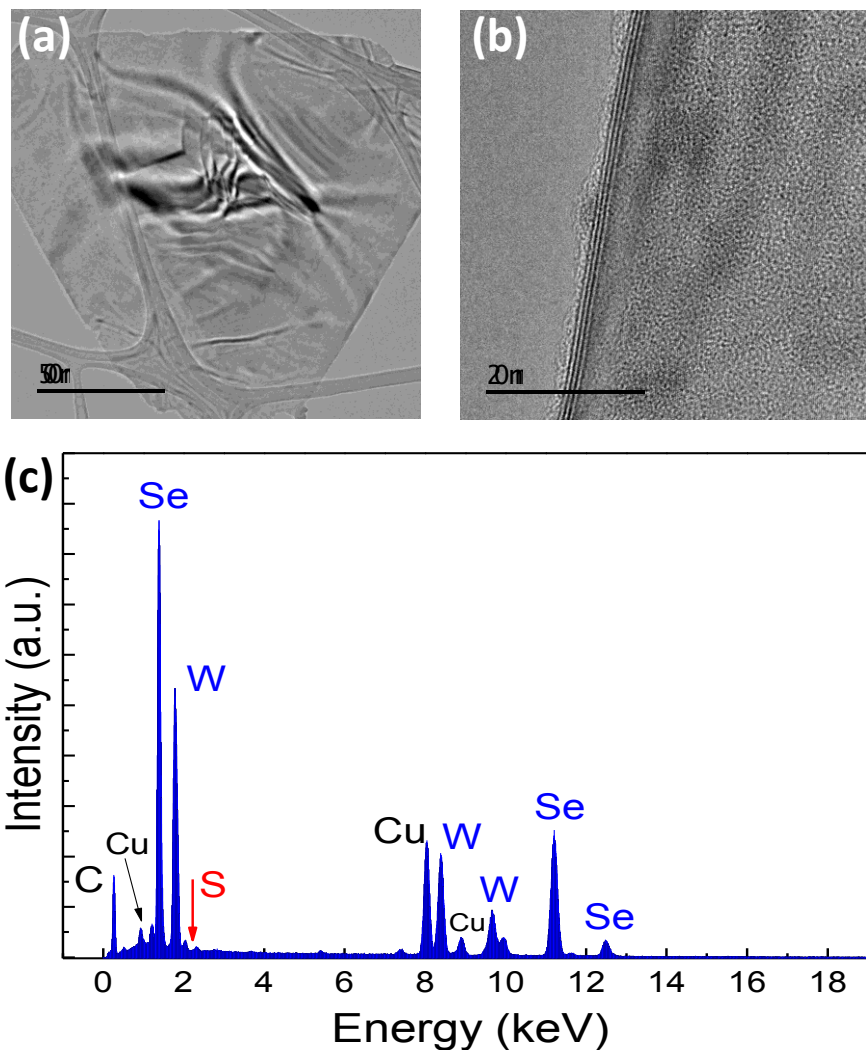


Figure S4. TEM-EDX characterization of as-grown WSe₂ flakes. (a) TEM image of a thin triangular WSe₂ flake transferred from silicon substrate to TEM grid. (b) High resolution TEM image along one edge of the flake. (c) A typical EDX spectrum taken from as-grown WSe₂ flakes. The sulfur peak (2.307 keV) is negligibly small indicating the concentration of sulfur is quite low, if any, in the as-grown WSe₂ samples. The peaks of Cu and C are from TEM grid.

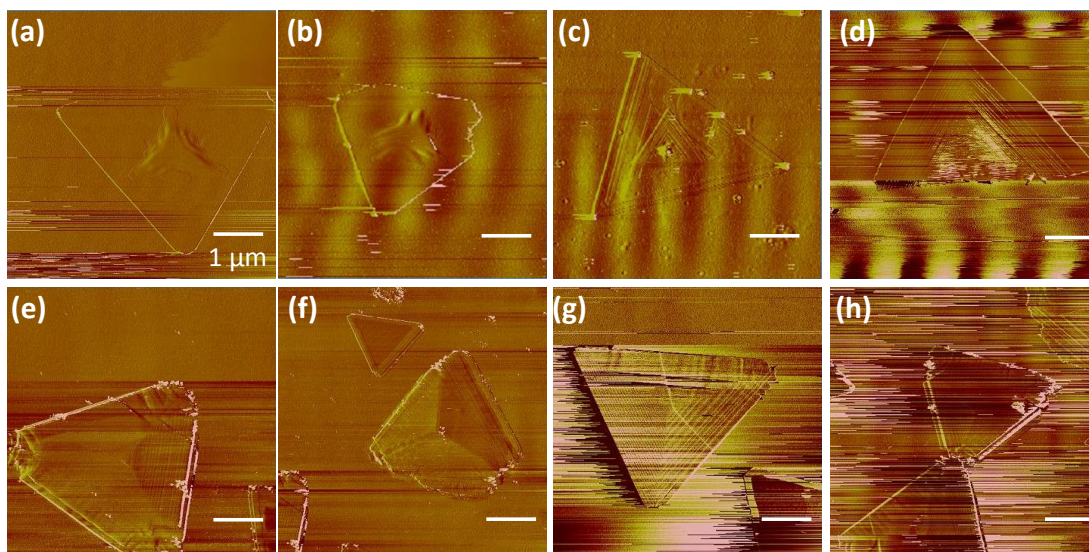


Figure S5. Systematic AFM studies on thick triangular flakes. Most of these triangular flakes have a 0° stacking angle.

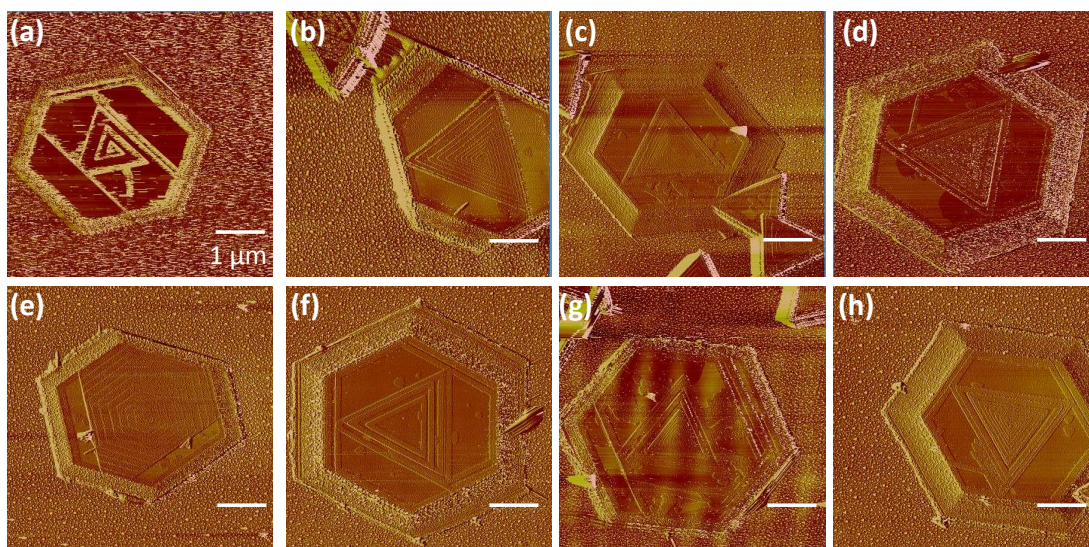


Figure S6. Systematic AFM studies on thick hexagonal flakes. The most common morphology is hexagon-triangle stacking with a 30° stacking angle.